

## CLAIMS

Having thus described the invention, what is claimed is:

1. A mass transfer column comprising:
  - an external shell having an inner surface and defining an open internal region;
  - at least one vapor-liquid contact tray disposed within the open internal region of the column;
  - an expansion ring underlying said at least one vapor-liquid contact tray,
  - the expansion ring having a first end segment and a second end segment defining a cutout in the expansion ring, said expansion ring having an upright leg and a tray support flange extending radially inwardly at an upper end of said upright leg, said tray support flange providing a support surface for said vapor-liquid contact tray;
  - an expander associated with said first and second end segments of the expansion ring,
  - the expander comprising a first bracket secured to the first end segment and a second bracket secured to the second end segment, a threaded member extending through said first and second brackets, and a pair of nuts carried on said threaded member and turnable against said first and second brackets to force said first and second end segments further apart to cause

the expansion ring to expand against the inner surface of said column shell;  
and

at least one seal plate positioned to block said cutout in the tray support flange of said expansion ring.

2. The column of claim 1, further comprising:

at least one support ring underlying the at least one vapor-liquid contact tray and secured to said column shell and a plurality of rods extending between said one support ring and said expansion ring to transfer a load carried by said expansion ring to said one support ring.

3. The column of claim 2, wherein said seal plate is carried by said threaded member.

4. The column of claim 3, wherein the expansion ring is divided into multiple ring segments defining more than one of said cutouts and wherein one of said expanders is associated with at least some of said cutouts.

5. The column of claim 3, wherein the first bracket comprises a vertical leg and a horizontal leg and said second bracket comprises a vertical leg and a horizontal leg and wherein said threaded member extends through holes in said vertical legs of the first and second brackets.

6. The column of claim 5, wherein said horizontal legs of said first and second brackets extend away from each other at opposite ends of said vertical legs.

7. The column of claim 6, wherein said seal plate is generally L-shaped and comprises a mounting portion carried by said threaded member and a seal portion covering said cutout in the tray support flange of said expansion ring.

8. The column of claim 4, wherein in a plurality of said ring segments each of said ring segments has one of said first brackets at one end of the ring segment and one of said second brackets at an opposite end of the ring segment and wherein the horizontal legs of the first and second brackets on said ring segment extend in opposite directions at opposite ends of said vertical legs.

9. The column of claim 2, wherein said support ring is positioned below said expansion ring.

10. The column of claim 2, wherein said support ring is positioned above said expansion ring.

11. The column of claim 7, wherein said seal plate includes spaced apart holes in said mounting portion to allow said seal plate to be reversibly carried on said threaded member.

12. An expansion ring positionable within a mass transfer column to support a vapor-liquid contact tray within an open internal region defined by an inner surface of a shell of the column, said expansion ring comprising:

an upright leg and a tray support flange extending radially inwardly at an upper end of said upright leg to provide a support surface for said vapor-liquid contact tray when positioned within said column;

a first end segment and a second end segment defining a cutout in the expansion ring;

an expander associated with said first and second end segments, said expander comprising a first bracket secured to the first end segment and a second bracket secured to the second end segment, a threaded member extending through said first and second brackets, and a pair of nuts carried on said threaded member and turnable against said first and second brackets to force said first and second end segments further apart to cause the expansion ring to expand against the inner surface of said column shell; and

a seal plate positionable on said threaded member to block said cutout in the tray support flange of the expansion ring.

13. The expansion ring of claim 12, wherein the first bracket comprises a vertical leg and a horizontal leg and said second bracket comprises a vertical leg and a horizontal leg and wherein said threaded member extends through holes in said vertical legs of the first and second brackets.

14. The column of claim 13, wherein said horizontal legs of said first and second brackets extend away from each other at opposite ends of said vertical legs.

15. The column of claim 14, wherein said seal plate is generally L-shaped and comprises a mounting portion carried by said threaded member and a seal portion covering said cutout in the tray support flange.

16. The column of claim 14, wherein the expansion ring is divided into multiple ring segments defining more than one of said cutouts and wherein one of said expanders is associated with at least some of said cutouts.

17. The column of claim 16, wherein in a plurality of said ring segments each of said ring segments has one of said first brackets at one end of the ring segment and one of said second brackets at an opposite end of the ring segment and wherein the horizontal legs of the first and second brackets on said ring segment extend in opposite directions at opposite ends of said vertical legs.

18. The column of claim 16, wherein said seal plate includes spaced apart holes in said mounting portion to allow said seal plate to be reversibly carried on said threaded member.

19. A method of supporting a vapor-liquid contact tray in a mass transfer column, the mass transfer column having an external shell having an inner surface defining an open internal region, the method comprising:

positioning at least one expansion ring underneath said vapor-liquid contact tray, said expansion ring having first and second ends defining an cutout in the expansion ring;

attaching at least one expander to said first and second end segments of the expansion ring, said expander comprising a first bracket attached to said first end segment, a second bracket attached to said second end segment, a threaded member extending through said first and second brackets;

forcing said first and second end segments apart using said expander to expand said expansion ring against the inner surface of said column shell; and

blocking a horizontal portion of said cutout in the expansion ring using a seal plate carried by said threaded member.

20. The method of claim 19, further comprising:

turning nuts carried on said threaded member against said first and second brackets to cause said forcing of said first and second end segments apart.

21. The method of claim 19, further comprising:

vertically spacing said expansion ring from a support ring secured to the inner surface of the column shell and securing opposite ends of a plurality of pedestals to the support ring and the expansion ring to transfer a load carried by the expansion ring to the support ring.